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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,121	04/01/2005	Steven Kenchington	BWT-70803	2620

7590 02/09/2006

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EXAMINER

RIDDLE, KYLE M

ART UNIT PAPER NUMBER

3748

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/530,121

Applicant(s)

KENCHINGTON ET AL.

Examiner

Kyle M. Riddle

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>08012005</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - Page 2, lines 1, 11, 12, and 20, "pressurised" should read --pressurized--;
 - Page 5, lines 2, 7, and 13, "pressurised" should read --pressurized--.

Appropriate correction is required.

Claim Objections

2. Claim 1 is objected to because of the following informalities: Page 3, lines 12 and twice on line 20 of the claim, and page 4, line 3, "pressurised" should read --pressurized--.

Appropriate correction is required.

3. Claim 9 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 9 is an exact duplicate of claim 3, both claims depending from claim 1.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 7-10, 13, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato et al. (Japanese Patent Publication 60085209 A).

Re claim 1, Sato et al. disclose an arrangement of an internal combustion engine poppet valve and a hydraulic actuator therefor comprising:

- an actuator housing (casing 20);
- spring means 16 for biasing the poppet valve into engagement with a valve seat

therefor;

- a first piston 21 of a first cross-sectional area slidable in a first chamber (large diameter bore of the casing 20) formed in the actuator housing, the first piston having a passage 27 for the flow of hydraulic fluid;

- a second piston 22 of a second cross-sectional area smaller than the first cross-sectional area slidable in a second chamber (small diameter bore of the casing 20) formed in the actuator housing, the second chamber opening on to the first chamber; wherein:

- the first chamber is connectable to a pressurized hydraulic fluid supply line 8 and to a hydraulic fluid return line 9;

- the second piston 22 has an upper surface engageable by a lower surface of the first piston (Fig.6); and

- the first piston is configured without a passage which is both aligned with the second piston and which has a portion of constant cross-sectional area greater than the said second cross-sectional area (the piston 21 is without such passage, as its passage 27 has a cross-section smaller than the cross-section of the second piston 22); whereby

- in order to open the poppet valve, the first chamber is connected to the pressurized hydraulic fluid supply line (Fig.7) and then supplied pressurized hydraulic fluid acts initially on the first piston to give rise to a first magnitude force which is initially relayed via the second

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piston to the engine valve to open the valve; initially the first piston, the second piston and the engine valve all move together under the action of the first magnitude force until the first piston reaches an end stop (Fig.7 shows the first piston stopped by the seat face 33, while the second piston alone pushes the valve open); and thereafter the supplied pressurized hydraulic fluid flows from the first chamber through the passage in the first piston to act on the second piston and to thereby give rise to a second smaller magnitude force under the action of which the second piston and the valve move together until the valve is fully open;

- in order to close the previously opened poppet valve, the first chamber is connected to the hydraulic fluid return line (Fig.6) and then the biasing force applied by the spring means to the valve forces the valve to move back towards its valve seat; initially the valve and the second piston move together with the second piston expelling fluid from the second chamber via the passage in the first piston to the hydraulic fluid return line until the second piston engages the first piston; and thereafter the first piston, the second piston and the valve all move together under the biasing force applied by the spring means with the first piston expelling hydraulic fluid from the first chamber to the hydraulic fluid return line until the poppet valve engages the valve seat therefor; and the movement of the second piston relative to the first piston is limited by abutment of the upper surface of the second piston with the lower surface of the first piston.

Re claim 2, Sato et al. disclose the second piston 22 directly abuts with its contact portion 29 the top of the valve stem of the poppet valve 14.

Re claims 3 and 9, Sato et al. disclose the top of the second piston 22 is designed to directly abut an inner face of the first piston 21 during the initial opening phase.

Re claims 4 and 10, Sato et al. disclose all the chambers defined by the various bores of different diameters are aligned.

Re claims 7 and 13, Sato et al. disclose the drillings 23, 24 permit trapped fluid to be expelled at the stop surface, whereby this fluid is directed to the fluid reservoir from which it can be relayed, through the pump, to the first chamber.

Re claims 8 and 14, Sato et al. disclose the valve spring acts between a collar (Fig.6, without reference sign) attached to the poppet valve and a surface provided on the cylinder head.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5, 6, 11, and 12 are rejected under 35 U.S.C. 103(a) as being obvious over Sato et al.

Sato et al. disclose an arrangement of an internal combustion engine poppet valve and a hydraulic actuator therefor comprising an actuator housing, spring means for biasing the poppet valve into engagement with a valve seat therefor, a first piston of a first cross-sectional area slidable in a first chamber formed in the actuator housing, the first piston having a passage for the flow of hydraulic fluid, a second piston of a second cross-sectional area smaller than the first cross-sectional area slidable in a second chamber formed in the actuator housing, the second chamber opening on to the first chamber, the first chamber is connectable to a pressurized hydraulic fluid supply line and to a hydraulic fluid return line, the second piston has an upper

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surface engageable by a lower surface of the first piston, the first piston is configured without a passage which is both aligned with the second piston and which has a portion of constant cross-sectional area greater than the said second cross-sectional area, and in order to open the poppet valve, the first chamber is connected to the pressurized hydraulic fluid supply line and then supplied pressurized hydraulic fluid acts initially on the first piston to give rise to a first magnitude force which is initially relayed via the second piston to the engine valve to open the valve, initially the first piston, the second piston and the engine valve all move together under the action of the first magnitude force until the first piston reaches an end stop, and thereafter the supplied pressurized hydraulic fluid flows from the first chamber through the passage in the first piston to act on the second piston and to thereby give rise to a second smaller magnitude force under the action of which the second piston and the valve move together until the valve is fully open, and in order to close the previously opened poppet valve, the first chamber is connected to the hydraulic fluid return line and then the biasing force applied by the spring means to the valve forces the valve to move back towards its valve seat, initially the valve and the second piston move together with the second piston expelling fluid from the second chamber via the passage in the first piston to the hydraulic fluid return line until the second piston engages the first piston, and thereafter the first piston, the second piston and the valve all move together under the biasing force applied by the spring means with the first piston expelling hydraulic fluid from the first chamber to the hydraulic fluid return line until the poppet valve engages the valve seat therefor, and the movement of the second piston relative to the first piston is limited by abutment of the upper surface of the second piston with the lower surface of the first piston. They, however, fail

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to disclose conical abutment surfaces acting as a restricting means to soften the impact of the pistons.

Conical and tapered surfaces are well known in the art for restricting fluid flow to soften impacts between relative moving members, and the use of such conical surfaces in the valve driving device of Sato et al. would have been a matter of obvious choice to one of ordinary skill depending on structural strength, fluid flow, and mating surfaces.

Conclusion

8. The IDS (PTO-1449) filed on 1 August 2005 has been considered. An initialized copy is attached hereto.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of 1 patent.

- Kenchington et al. (UK Patent Application GB 2394000 A) disclose the same applicant contained herein.

Communication

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyle M. Riddle whose telephone number is (571) 272-4864. The examiner can normally be reached on M-F (07:30-5:00) Second Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

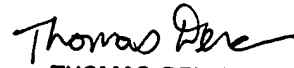
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kyle M. Riddle
Examiner
Art Unit 3748

kmr



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